

Efficient Thermally Stable Spectral Control Filters for Thermophotovoltaics, Phase I

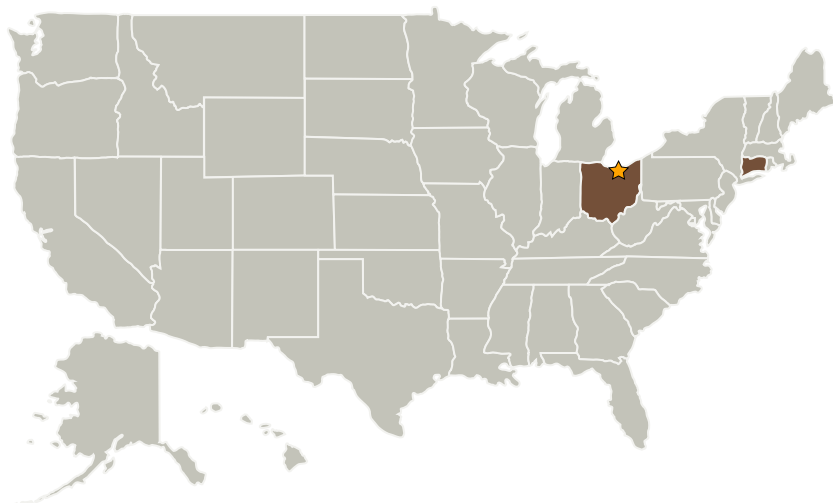
Completed Technology Project (2007 - 2007)



Project Introduction

The feasibility of radioisotope thermophotovoltaic (RTPV) power systems has been shown. The best efficiencies reported to date for a TPV module test include front surface spectral control filters. This program will address the technical challenges to developing and qualifying highly efficient spectral control filters that can survive high temperatures (above 150 degrees C) for long periods of time. In earlier work, we have identified thermally stable filter materials and demonstrated their use as high index filter materials, however they are quite sensitive to deposition conditions. In this program, we will (1) optimize deposition conditions to improve reliability, repeatability, uniformity, and filter performance, (2) develop and optimize filter designs for radioisotope power, (3) conduct extended high temperature, long life, radiation, and environmental durability testing, (4) identify other potential high temperature materials, (5) address the use of multiple spectral control architectures including spectrally selective emitters, back surface reflectors (BSR) and photonic crystals, and (5) integrate the spectral control architectures with RTPV technology to address NASA missions.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Rugate Technologies, Inc.	Supporting Organization	Industry	Oxford, Connecticut

Primary U.S. Work Locations

Connecticut	Ohio
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - └ TX07.1 In-Situ Resource Utilization
 - └ TX07.1.2 Resource Acquisition, Isolation, and Preparation